

Claims

1. A circuit arrangement, for generating an x-ray tube voltage, comprising:
 - 5 an inverse rectifier circuit (G_{si}) for generating a high-frequency alternating voltage,
 - 10 a high-voltage generator (G_{su}) for converting the high-frequency alternating voltage into a high voltage for the x-ray tube ,
 - 15 a voltage controller (G_{RU}), which based on a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$) generates a first controlling variable value ($Y_{U(t)}$) for the inverse rectifier circuit (G_{si}) ,
 - 20 a measurement circuit for measuring an oscillating current ($i_{sw(t)}$) applied to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,
 - 25 an oscillating current controller (G_{RI}), which based on a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value (W_{I_max}) generates a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}), and wherein
 - 30 a switching device, connected downstream of the voltage controller (G_{RU}) and the oscillating current controller(G_{RI}), operable to compare the first controlling variable value ($Y_{U(t)}$) and the second controlling variable value ($Y_{I(t)}$) and is operable to send the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}).

2. The circuit arrangement as of claim 1, wherein
at least one of the voltage controller (G_{RU}) and the
oscillating current controller (G_{RI}) includes a PI
5 controller.

3. The circuit arrangement as of claim 1, wherein
one output of the switching device is connected to at
least one of the voltage controller (G_{RU}) and of the
10 oscillating current controller (G_{RI}); and that the voltage
controller (G_{RU}) and the oscillating current controller
(G_{RI}) are such the resultant controlling variable value
($Y(t)$) is carried along, if neither one of the controlling
variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their
15 respective controllers is sent onward as the resultant
controlling variable value ($Y(t)$).

4. The circuit arrangement as of claim 2, wherein
20 one output of the switching device is connected to at
least one of the voltage controller (G_{RU}) and of the
oscillating current controller (G_{RI}); and that the voltage
controller (G_{RU}) and the oscillating current controller
(G_{RI}) are such the resultant controlling variable value
25 ($Y(t)$) is carried along, if neither one of the controlling
variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their
respective controllers is sent onward as the resultant
controlling variable value ($Y(t)$).

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5. The circuit arrangement as of claim 1, wherein
the switching device is such that no controlling variable
lower than a predetermined minimum controlling variable
value (Y_{min}) is sent onward as the resultant controlling
35 variable value ($Y(t)$) to the inverse rectifier circuit

(G_{si}) .

6. The circuit arrangement as of claim 4, wherein
5 the switching device is such that no controlling variable
lower than a predetermined minimum controlling variable
value (Y_{min}) is sent onward as the resultant controlling
variable value ($Y(t)$) to the inverse rectifier circuit
(G_{si}).

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7. The circuit arrangement as of claim 1, wherein
switching device is such that no controlling variable
higher than a predetermined maximum controlling variable
value (Y_{max}) is send onward as the resultant controlling
15 variable value ($Y(t)$) to the inverse rectifier circuit
(G_{si}).

8. The circuit arrangement as of claim 6, wherein
switching device is such that no controlling variable
20 higher than a predetermined maximum controlling variable
value (Y_{max}) is send onward as the resultant controlling
variable value ($Y(t)$) to the inverse rectifier circuit
(G_{si}).

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9. The circuit arrangement as of claim 1, wherein
at least one of the voltage controller (G_{RU}) and the
oscillating current controller (G_{RI}) can vary at least one
30 parameter, the at least one parameter being a function of
at least one of a set x-ray tube voltage (U_{Ro}) and a set x-
ray tube current (I_{Ro}).

10. An x-ray generator having a circuit arrangement
35 of claims 1.

11. An x-ray generator having a circuit arrangement of claim 8.

5 12. An x-ray system having an x-ray generator of claim 10.

13. A method for generating an x-ray tube voltage where a high-frequency alternating voltage is generated
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an inverse rectifier circuit (G_{si}), the high-frequency alternating voltage is converted into a high voltage for the x-ray tube v a high-voltage generator (G_{su}), and a first controlling variable value ($Y_{U(t)}$) is generated for the
15 inverse rectifier circuit (G_{si}) via a voltage controller (G_{RU}) due to a deviation of an x-ray tube voltage ($V_U(t)$) from a set-point x-ray tube voltage ($W_{U(t)}$), the method comprising:

20 measuring an oscillating current ($i_{sw(t)}$) via a measurement circuit that is connected to one output of the inverse rectifier circuit (G_{si}) of the high-frequency alternating voltage,

25 generating a second controlling variable value ($Y_{I(t)}$) for the inverse rectifier circuit (G_{si}) via an oscillating current controller (G_{RI}), due to a deviation of an ascertained actual oscillating current value ($V_I(t)$) from a predetermined maximum oscillating current value ($W_{I_{max}}$),

30 comparing the first controlling variable value ($Y_{U(t)}$) and the second controlling variable value ($Y_{I(t)}$) via a switching device, the switching device being connected downstream of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}), and

35 sending the lesser of the first and second controlling variable values ($Y_{U(t)}$ and $Y_{I(t)}$) onward as a

resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}).

5 14. The method as of claim 13, further comprising using a PI controller in at least one of the voltage controller (G_{RU}) and the oscillating current controller (G_{RI}).

10 15. The method as of claim 13, further comprising feeding back the resultant controlling variable value ($Y(t)$) as an input value to at least one of the voltage controller (G_{RU}) and/or to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value ($Y(t)$), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

20 16. The method as of claim 14, further comprising feeding back the resultant controlling variable value ($Y(t)$) as an input value to at least one of the voltage controller (G_{RU}) and to the oscillating current controller (G_{RI}), and carrying along the resultant controlling variable value ($Y(t)$), if neither one of the controlling variable values ($Y_{U(t)}$) and ($Y_{I(t)}$) generated by their respective controllers is sent onward as the resultant controlling variable value ($Y(t)$).

30 17. The method as of claim 13, further comprising sending onward as the resultant controlling variable value ($Y(t)$) to the inverse rectifier circuit (G_{si}), via the switching device, a controlling variable not lower than a predetermined minimum controlling variable value (Y_{min}).

18. The method as of claim 14, further comprising
sending onward as the resultant controlling variable value
(Y(t)) to the inverse rectifier circuit (G_{si}), via the
5 switching device, a controlling variable not lower than a
predetermined minimum controlling variable value (Y_{min}).

19. The method as of claim 13, further comprising
10 sending onward as the resultant controlling variable value
(Y(t)) to the inverse rectifier circuit (G_{si}), via the
switching device, a controlling variable not higher than a
predetermined maximum controlling variable value (Y_{max}).

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20. The method as of claim 14, further comprising
sending onward as the resultant controlling variable value
(Y(t)) to the inverse rectifier circuit (G_{si}), via the
switching device, a controlling variable not higher than a
20 predetermined maximum controlling variable value (Y_{max}).

21. The method as of claim 12, further comprising
varying at least one parameter within at least one of the
voltage controller (G_{RU}) and the oscillating current
25 controller (G_{RI}), the at least one parameter being a
function of at least one of a set x-ray tube voltage (U_{Ro})
and a set x-ray tube current (I_{Ro}).

22. The method as of claim 14, further comprising
30 varying at least one parameter within at least one of the
voltage controller (G_{RU}) and the oscillating current
controller (G_{RI}), the at least one parameter being a
function of at least one of a set x-ray tube voltage (U_{Ro})
or a set x-ray tube current (I_{Ro}).

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